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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,176	10/02/2003	Amir Geva	1009-1013	8311

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EXAMINER	
TOTH, KAREN E	

ART UNIT	PAPER NUMBER
3735	

NOTIFICATION DATE	DELIVERY MODE
04/03/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

daniel@dkpat.co.il
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Office Action Summary	**Application No.** 10/677,176	**Applicant(s)** GEVA ET AL.
	Examiner KAREN E. TOTH	**Art Unit** 3735

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 26 January 2009.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-40,43-55 and 57-62 is/are pending in the application.

4a) Of the above claim(s) 1-40 and 43-52 is/are withdrawn from consideration.

5)☒ Claim(s) 58-62 is/are allowed.

6)☒ Claim(s) 53-55 and 57 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 1/26/09.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 112

2. Applicant's arguments, see the remarks filed 26 January 2009, with respect to the rejection under 35 USC 112 of claims 58-62 have been fully considered and are persuasive. The rejection of these claims has been withdrawn.

Claim Rejections - 35 USC § 103

3. Claims 53-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pichlmayr (US Patent 5846208) in view of Kaplan (*A. Kaplan et al.*: *Journal of Neuroscience Methods* 106 (2001) 81–90).

Regarding claim 53, Pichlmayr discloses an apparatus for sleep diagnosis comprising sensors adapted to receive signals from a sleeping patient during a time period (elements 16), and a processor configured to extract features from the signals and group them into clusters, determine a degree of association between the signals in an interval and a respective cluster to a plurality of intervals in the time period, and to evaluate a condition of the patient in response to the association (column 2, lines 40-50; column 7, lines 41-46). Pilchmayr does not disclose the feature extraction and clustering comprising adaptively segmenting the signals into a sequence of quasi-stationary segments, where the segments are clustered responsive to features extracted from the segments, nor does Pilchmayr disclose assigning membership values to the segment clusters based on the association between features of the signal for evaluation of the patient condition. Kaplan teaches sleep analysis comprising adaptive segmentation of a captured biosignal into quasi-stationary segments that are then clustered responsively to extracted features (sections 3.1, 3.3), where intervals in the time period are assigned memberships based on the segment clusters (section 3.2), in order to provide quantitative analysis of the captured biosignals. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made the system of Pilchmayr with the processor configured to perform adaptive segmentation into quasi-stationary segments and assign membership values, as taught by Kaplan, in order to provide quantitative analysis of the captured signals.

Regarding claim 54, Kaplan further teaches using the membership values to determine sleep stages (table 2), in order to determine the patient's current state. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made the system of Pilchmayr in view of Kaplan with the processor configured to use the membership values to determine sleep stages, as taught by Kaplan, in order to determine the patient's current state.

Regarding claim 55, Pichlmayr discloses the signals comprising electroencephalogram signals (column 2, lines 37-40).

4. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pichlmayr in view Kaplan, and further in view of Moore-Ede (US Patent 6511424).

Regarding claim 57, Pichlmayr in view of Kaplan discloses all the elements of the claimed invention, as described above, except for assigning fuzzy membership values to the intervals. Moore-Ede teaches using fuzzy systems to analyze sleep signals, including assigning fuzzy membership values to data and intervals (column 4 line 55 to column 5 line 4; column 5, lines 14-15), in order to obtain useful information from the data. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have made the system of Pichlmayr in view of Kaplan with the processor configured to assign fuzzy membership values to the intervals, as taught by Moore-Ede, in order to obtain useful information from the data.

Allowable Subject Matter

5. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record fails to anticipate or make obvious the inventions of claim 58, including, *inter-alia*, extracting features from biomedical signals recorded from a sleeping patient and grouping the features into clusters, assigning membership vectors to a plurality of intervals during the period when the signals were recorded, where the membership vector values indicate a degree of association between the signals in a corresponding interval and a respective cluster, using a state machine model comprising machine states corresponding to physiological states, and, responsive to the vectors and the state machine model states, evaluating a condition of the patient.

The prior art of record fails to anticipate or make obvious the inventions of claims 59-62, including, *inter-alia*, an apparatus comprising sensors for receiving biomedical signals from a sleeping patient, and a processor adapted to receive a definition of a state machine model comprising machine states corresponding to the patient's physiological states, where the model comprises respective probabilities of transitions between states, and where the processor adaptively segments the signals and determines features of the segments that are used with the transition probabilities to assign state classifications to the segments, and evaluates a condition of the patient during a signal recording period based on the state classifications.

Kaplan discloses a similar system using adaptive segmentation of biosignals, but does not disclose using the segmented signals with machine states and transition probabilities to determine the patient's condition.

Response to Arguments

6. Applicant's arguments with respect to claims 53-55 and 57 have been considered but are moot in view of the new ground(s) of rejection.

The new rejections of these claims were necessitated by the amendments to the claims and therefore stand as FINAL.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

AGARWAL, R., and GOTMAN, J. (2001): 'Computer-assisted sleep staging', *IEEE Trans. Biomed. Eng.,* 48, pp. 1412-1423

G. BODENSTEIN and H.M. PRAETORIUS (1977). Feature extraction from the encephalogram by adaptive segmentation. *Proc. IEEE*, vol.65, pp.642-652.

I. Gath and A. B. Geva, "Unsupervised optimal fuzzy clustering," ***IEEE Trans. Patt. Anal. Machine Intell.,*** vol. 11, no 7, July 1989.

Roberts and Tarassenko, 1992. S. Roberts and L. Tarassenko, New method for automated sleep quantification. *Med. Biol. Eng. Comp.* **30** (1992), pp. 509–517

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAREN E. TOTH whose telephone number is (571)272-6824. The examiner can normally be reached on Mon thru Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Charles Marmor II can be reached on 571-272-4730. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Robert L. Nasser Jr/
Primary Examiner, Art Unit 3735

/K. E. T./
Examiner, Art Unit 3735